

What is claimed is:

1. A method of detecting biological contamination in a liquid comprising part of a coating process, the method comprising the step of:

(a) measuring a carbon dioxide content of at least a portion of the atmosphere adjacent the liquid.

2. The method according to claim 1, further comprising the step of:

(b) determining a baseline level of carbon dioxide in the area of the liquid.

3. The method according to claim 1, wherein the liquid comprises a biological contaminant.

4. The method according to claim 1, wherein the liquid comprises a coating material.

5. The method according to claim 1, wherein the liquid comprises water.

6. The method according to claim 1, wherein the liquid comprises part of a continuous electrodeposition coating process.

7. The method according to claim 1, wherein the liquid is a coating composition located in a coating tank.

8. The method according to claim 7, wherein the coating composition is an electrodepositable coating composition.

9. The method according to claim 7, wherein the coating composition is waterborne.

10. The method according to claim 7, wherein the coating composition is a basecoating composition.

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11. The method according to claim 7, wherein the coating composition is a topcoating composition.
12. The method according to claim 7, wherein the measuring step (a) includes measuring the carbon dioxide content of the atmosphere above the liquid in the coating tank.
13. The method according to claim 1, wherein the liquid is an aqueous rinse composition located in a rinse tank.
14. The method according to claim 13, wherein the measuring step (a) includes measuring the carbon dioxide content of the atmosphere above the liquid in the rinse tank.
15. The method according to claim 2, further comprising the step of:
- (c) comparing the measured carbon dioxide level from step (a) to the baseline carbon dioxide level from step (b) to establish biological contamination when the measured carbon dioxide level is greater than a predetermined amount above the baseline carbon dioxide level.
16. The method according to claim 15, further comprising the step of:
- (d) adding a biocide to the liquid when the measured carbon dioxide content is at or above the predetermined amount above the baseline carbon dioxide level.
17. The method according to claim 16, wherein the adding step (d) is automatically controlled.
18. The method according to claim 16, further comprising the step of:
- (e) selecting a measured carbon dioxide level above the baseline level as a biocide addition setpoint.

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19. The method according to claim 18, further comprising the step of:

(f) determining an amount of biocide to be added from step (e).

20. The method according to claim 19, further comprising the step of:

(g) adding the determined amount of biocide to the liquid when the carbon dioxide level reaches the setpoint.

21. The method according to claim 20, wherein the adding step (g) is automatically controlled.

22. A method of detecting and controlling a level of biological contaminant in a continuous coating process comprising a liquid, comprising the steps of:

(a) measuring a carbon dioxide content of a portion of the atmosphere adjacent the liquid;

(b) determining a baseline carbon dioxide level in the area of the liquid;

(c) comparing the measured carbon dioxide level to the baseline carbon dioxide level; and

(d) adding a biocide to the liquid when the measured carbon dioxide level is a predetermined amount above the baseline level.

23. The method according to claim 22, wherein the liquid comprises a coating material.

24. The method according to claim 22, wherein the liquid comprises part of a continuous electrodeposition coating process.

25. The method according to claim 22, wherein the liquid is a coating composition located in a coating tank.

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26. The method according to claim 25, wherein the coating composition is an electrodepositable coating composition.

27. The method according to claim 25, wherein the measuring step (a) includes measuring the carbon dioxide content of the atmosphere above the coating tank.

28. The method according to claim 27, wherein the adding step (d) is automatically controlled.

29. The method according to claim 28, further comprising the step of:

(e) selecting a difference in carbon dioxide level between the measured level and the baseline level as a biocide addition setpoint.

30. The method according to claim 29, further comprising the step of:

(f) adding biocide to the liquid when the measured carbon dioxide level reaches the setpoint.

31. The method according to claim 30, wherein the adding step (f) is automatically controlled.

32. The method according to claim 22, wherein the measuring step (a) includes positioning at least one carbon dioxide sensor adjacent the liquid.

33. The method according to claim 32, including electronically connecting the carbon dioxide sensor with at least one control device.

34. The method according to claim 33, including electronically connecting the control device with at least one biocide addition device, with the biocide addition device in

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flow communication with the liquid, and with the control device configured to automatically activate the biocide addition device to deliver a predetermined amount of biocide to the liquid when the sensor senses the predetermined level of carbon dioxide.

35. The method according to claim 22, wherein the liquid is a rinse composition located in a rinse tank.

36. The method according to claim 35, wherein the measuring step (a) includes measuring the carbon dioxide content of the atmosphere above the rinse composition in the rinse tank.

37. The method according to claim 36, wherein the adding step (d) is automatically controlled.

38. A coating system, comprising:
a container for containing a liquid comprising part of a coating process; and
at least one carbon dioxide sensor located adjacent the container.

39. The coating system according to claim 38, wherein the coating system is an automotive coating system.

40. The coating system according to claim 38, wherein the coating system comprises a continuous electrodeposition coating system.

41. The coating system according to claim 38, wherein the liquid is a coating composition and the container is a coating tank.

42. The coating system according to claim 41, wherein the coating composition is an electrodepositable coating composition.

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43. The coating system according to claim 41, wherein the coating composition is waterborne.

44. The coating system according to claim 41, wherein the coating composition is a basecoating composition.

45. The coating system according to claim 41, wherein the coating composition is a topcoating composition.

46. The coating system according to claim 38, wherein the liquid is a rinse composition and the container is a rinse tank.

47. The coating system according to claim 38, including a control device in electronic communication with the at least one sensor.

48. The coating system according to claim 47, including at least one biocide addition device in electronic communication with the control device and in flow communication with the container.

49. An electrodeposition coating system, comprising:
a coating tank;
a coating composition located in the coating tank;
at least one rinse tank;
a rinse composition located in the at least one rinse tank; and
at least one carbon dioxide sensor located adjacent at least one of the coating tank and the rinse tank.

50. The electrodeposition coating system according to claim 49, further including at least one control device in electronic communication with the at least one sensor.

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51. The electrodeposition coating system according to claim 50, further including at least one biocide addition device in electronic communication with the control device and configured to add biocide to at least one of the coating tank and the rinse tank.

52. A method of detecting a biological contaminant in a steps of:

- (a) obtaining a sample of the liquid; and liquid comprising part of a coating process, comprising the
- (b) measuring a carbon dioxide content of at least a portion of the atmosphere adjacent the sample.

53. The method according to claim 52, further comprising the steps of:

- (c) determining a baseline carbon dioxide level; and
- (d) determining biological contamination in the liquid by comparing the measured carbon dioxide level to the baseline level.

54. The method according to claim 53, further comprising the step of:

- (e) adding a biocide to the liquid when the measured carbon dioxide content is at or above a predetermined level with respect to the baseline level after step (d).

55. A method of determining biological contamination in a liquid comprising part of a coating process, comprising the steps of:

- (a) determining a baseline carbon dioxide level in the vicinity of the liquid;
- (b) measuring a carbon dioxide level of at least a portion of the atmosphere adjacent the liquid;
- (c) comparing the measured carbon dioxide level to the baseline carbon dioxide level; and

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(d) determining biological contamination when the measured carbon dioxide level is a selected amount above the baseline level.

56. The method according to claim 55, wherein the liquid is in a container and step (a) comprises measuring an ambient carbon dioxide level adjacent the container for a period of time to determine changes in ambient carbon dioxide level over a plurality of reference times.

57. The method according to claim 56, wherein step (d) comprises:

(e) measuring the carbon dioxide level adjacent the liquid;

(f) comparing the measured carbon dioxide level from step (e) to the baseline carbon dioxide level for a substantially similar reference time; and

(g) determining biological contamination in the liquid when the measured carbon dioxide level from step (e) is greater than the baseline carbon dioxide level for a substantially similar reference time.

58. The method according to claim 57, wherein step (h) comprises adding a biocide to the liquid when biological contamination is determined.

59. The method according to claim 57, wherein the ambient carbon dioxide level adjacent the container is measured to provide a diurnal ambient carbon dioxide level.

60. The method according to claim 58, including adding the biocide when the measured carbon dioxide level is greater than 100 ppm above the baseline carbon dioxide level for a substantially similar reference time.

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61. The method according to claim 58, including adding the biocide when the measured carbon dioxide level is greater than three standard derivations above the baseline carbon dioxide level for a substantially similar reference time.

62. A method of detecting a biological contaminant in a coating liquid, comprising the steps of:

- obtaining at least a portion of the coating liquid;
- measuring a carbon dioxide content of the atmosphere adjacent the coating liquid; and

- comparing the measured carbon dioxide content to a database to estimate the level of biological contaminant in the coating liquid.

63. The method according to claim 62, wherein the database is formed by:

- obtaining a plurality of samples of coating liquids having different levels of biological contaminants;

- measuring the carbon dioxide content of at least a portion of the atmosphere adjacent the samples;

- determining a level of biological contamination in each of the coating liquids; and

- correlating the measured carbon dioxide content to the determined level of biological contamination.

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